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Dobbs-Nicholson score for prescribing digoxin

Sir,

In 1978 Nicholson *et al* and Dobbs *et al* developed a new score for prescribing digoxin,[1 2] which included information on the patient's physical activity, cardiac rhythm, and diuretic treatment, and whether the patient was an inpatient or outpatient.

We have studied 84 medical inpatients (48 women, 36 men) with a mean age of 74 (range 51–94) years, a mean body weight of 64 kg (range 35–104 kg), and a mean serum creatinine concentration of 112 μmol/l (range 60–269 μmol/l). All patients received a maintenance dose of digoxin on admission. Seventy-two patients received diuretics. Maintenance treatment with digoxin was continued in hospital at a dose determined by the Dobbs-Nicholson score for inpatients. After seven days' treatment blood samples were collected in the morning for analysis of serum digoxin concentration. The number of digoxin tablets of 62·5 μg prescribed daily according to the score is shown in the Table, and the distribution of the serum concentrations of digoxin after seven days in the Figure.

The Dobbs-Nicholson score was developed to maintain serum digoxin concentrations within a therapeutic range of 1–2 ng/ml corresponding to 1·3–2·6 nmol/l. In our study, using the Dobbs-Nicholson score, only 38 (45%) patients had serum digoxin concentrations within this range. Nicholson *et al* reported that of 129 patients (110 outpatients, 19 inpatients) 72% had serum concentrations within the therapeutic range.[1] The discrepancy between the results of the two studies can be explained by the difference in the number of inpatients and outpatients, which gives a difference in the score of 17 points and a lower dose for inpatients.

We conclude that the Dobbs-Nicholson score in its original form underestimates the dose for inpatients. Perhaps the score for outpatients with extra points can be used for inpatients as well.

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Table *Number of digoxin tablets of 62·5 μg per day prescribed for 84 medical inpatients according to the Dobbs-Nicholson score*

No of tablets:	*1*	*2*	*3*	*4*	*5*
No of patients	15	50	11	8	0

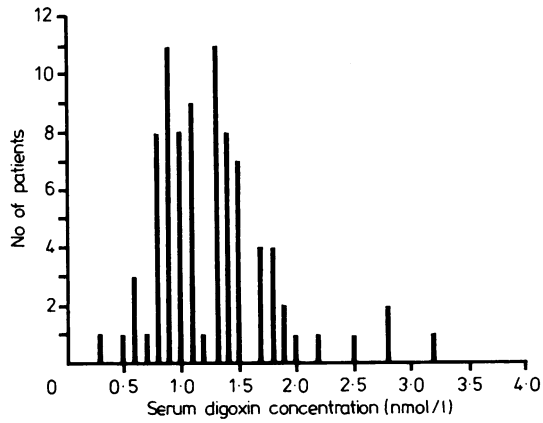

Figure *Serum digoxin concentration in 84 medical inpatients treated for seven days with oral digoxin as calculated according to the Dobbs-Nicholson score for inpatients (mean 1·27 nmol/l, SD±0·51).*

References

1 Nicholson PW, Dobbs SM, McGill APJ, Rodgers EM, Slater E. A score for prescribing digoxin. *Br Heart J* 1978; **40**: 177–83.
2 Dobbs SM, Nicholson PW, Rodgers EM, Mawer GE, Kenyon WI. Digoxin prescribing: an evaluation of clinical judgment. *Br Med J* 1978; ii: 668–9.

This letter was shown to the authors, who reply as follows:

Sir,

The discrepancy between our study[1] and that of Serup *et al* may be more apparent than real. Serup *et al* say, "the blood samples for assay of serum digoxin concentration were collected in the morning." Without further information, it seems reasonable to assume that the samples were taken immediately before administration of the daily dose. Then, if their mean

predose serum digoxin concentration is 1·27 nmol/l, the corresponding mean concentration during the dosage interval under steady state conditions would be approximately 1·27/0·74 nmol/l—that is, 1·72 nmol/l,[2] which is similar to the target concentration of the score of 1·6 nmol/l. Given that the values of the mean steady state concentration are distributed normally around a mean of 1·72 nmol/l, with a standard deviation of 0·51/0·74 nmol/l—that is 0·69 nmol/l, 62% of the population would be expected to have mean steady state concentrations within the therapeutic range of 1·28 to 2·56 nmol/l. Our projection that the use of the score would result in mean steady state concentrations within the desired range in 72% of the population presumes that the score is being tested against a mean of four estimates of mean steady state concentration per patient. If fewer estimates per patient are available the apparent performance of the score will underestimate its potential. For example, if, as in the case of Serup *et al*, the evaluation of the score is based on a single estimate of mean steady state concentration per patient only 64% of patients taking the recommended dose can be expected to have concentrations in the desired range.[3] Our projected value of 72% also presumes that the future trial is carried out in a similar population. Serup *et al*'s patients are considerably older (mean 74, range 51–94 years) than those from whom the score was derived (mean 59±12 years).

Ideally, the general applicability of our score should be tested in a much larger number of compliant patients than the 129 of the original study. We are aware of one other published study of the score. This involved only 37 patients, 57% of whom achieved concentrations in the desired range.[4] Unfortunately, these few patients were neither consecutive nor randomly selected. Moreover, it was not clear whether the daily dose was given at one time or divided, neither was the exact timing of the blood samples in relation to the dose given.

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References

1 Nicholson PW, Dobbs SM, McGill APJ, Rodgers EM, Slater E. A score for prescribing digoxin. *Br Heart J* 1978; **40**: 177–83.
2 Nicholson PW, Dobbs SM, Rodgers EM. Ideal sampling time for drug assays. *Br J Clin Pharmacol* 1980; **9**: 467–70.
3 Dobbs RJ, Nicholson PW, Dobbs SM. Prediction of digoxin dose requirements. In: Prescott L, Gibaldi M, eds. *Handbook of clinical pharmacokinetics*. Sidney: ADIS Press, 1983: (section IV) 276–95.
4 Johnston GD, Harron DWG, McDevitt DG. Can digoxin prescribing be improved? A comparison between intuitive and assisted dose selection. *Eur J Clin Pharmacol* 1979; **16**: 229–35.

Notices

Cardiovascular Pharmacotherapy International Symposium

An international symposium will be held from 22 to 26 April 1985 in Geneva, Switzerland. Further information may be obtained from: Secretariat, Interconference SA, 58 rue Ernest-Bloch, CH-1207 Geneva, Switzerland.

British Cardiac Society

The Autumn Meeting in 1984 will be held on 3 and 4 December 1984, and the closing date for receipt of abstracts will be 15 August 1984.